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A Natural Compound Offers Hope for Bacterial Wilt Control

Plant pathologists and other scientists have been searching for a method of controlling bacterial wilt of plants for many years. Finally, there might be a breakthrough. In May of 2005 came the first report concerning the use of thymol for controlling this plant disease under field conditions. More on that later, but first let's take a look at this plant disease that has been so persistent and costly for many years.

Bacterial wilt is one of the most damaging plant diseases found worldwide and even in local vegetable fields and home gardens. This is for example, the disease that causes tomato plants to suddenly wilt and die. In many cases symptoms occur when the plants seem otherwise healthy and loaded with green fruit.

This bacterial pathogen has a very extensive host range, including hundreds of plant species. It is recognized as one of the most important bacterial diseases of plants.

Bacterial wilt, caused by the pathogen *Ralstonia solanacearum*, is a soil borne disease and once present, lives for long periods of time to later infect plants established in the area. Currently used chemicals are not an option. It is so resistant to chemicals that even methyl bromide, considered to be the most effective soil fumigant, has little effect.

Plant breeding continues in an effort to develop varieties and cultivars with resistance to bacterial wilt. Little progress has been made, partly due to the wide range of plants that are susceptible to the disease and plant characteristics that must sometimes be sacrificed by breeders in order to gain resistance.

It can rest or remain dormant in the soil indefinitely, so crop rotation which is effective in controlling many other diseases, doesn't work on this one. It can also live over from season to season on nearby host plants, even some weeds.

The bacterial wilt pathogen enters plant roots and kills by plugging the stem's vascular tubes. Once a plant is infected, spraying or other treatment has no positive effect in controlling this disease.

This is obviously a very highly infectious and all too common disease in vegetable fields and landscapes. A recent study now offers some hope that control might be available soon.

Scientists at the University of Florida's IFAS North Florida Research and Education Center in Quincy have evaluated thymol as a biofumigant for controlling bacterial wilt in commercial tomato plantings.

Thymol is an essential oil that is produced by the thyme plant. This product has been used as an antiseptic, as an additive in cosmetics, in the food industry and for treatment of oral infections in dentistry for over a century. It is therefore generally considered as a safe compound by the U.S. Food and Drug Administration and the Environmental Protection Agency.

A prescribed amount of thymol was applied to the soil in bacterial wilt infested fields and then the soil was sealed with plastic mulch film for either three or six days. Tomato seedlings were transplanted into the fields seven days later.

Results of greenhouse studies, followed two years of field experiments have yielded some amazing results. In 2003 for example, over 65 percent of plants in the untreated control were lost, while only 12 percent died in the area treated with thymol. The tomato fruit yield was almost four times greater in areas treated with thymol.

Though this is exciting news, there is more work that must be done in developing a practical treatment. Studies are in progress evaluating drip irrigation as a possible method of thymol application. Other issues need clarification such dosage, most efficient method of application and its use with certain plant varieties. This requires a more comprehensive evaluation.

Studies such as this open up a whole new phase of research into disease management. There are other essential oils from plants that will be receiving attention and other naturally occurring compounds that haven't been explored yet. Just finding one that gives us hope of managing bacterial wilt certainly makes the search worthwhile.

Note: Readers who would like more in-depth information on this research can view or print the entire paper. It is entitled "Evaluation of Thymol as a Biofumigant for Control of Bacterial Wilt of Tomato Under Field Conditions",It was published by The American Phytopathological Society – May 2005 Issue. Go to: www.apsnet.org.